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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,062	02/06/2004	Vladimir Poponin	VIRTP.002DV1C1	4803

20995 7590 01/12/2007  
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EXAMINER
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KIM, YOUNG J

ART UNIT	PAPER NUMBER
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1637

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	01/12/2007	ELECTRONIC

- Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 01/12/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jcartee@kmob.com  
eOAPilot@kmob.com

**Office Action Summary**

Application No.

10/774,062

Applicant(s)

POPONIN, VLADIMIR

Examiner

Young J. Kim

Art Unit

1637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2 and 13-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-20 is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                            |                                                                                         |
|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

### DETAILED ACTION

The present Office Action is responsive to the Amendment received on December 18, 2006.

#### *Preliminary Remark*

The instant Office Action contains at least one rejection which was not necessitated by Amendment, and thus, is made **Non-Final**.

Claims 3-12 are canceled.

Claims 1, 2, and 13-20 are pending and are under prosecution herein.

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vo-Dinh et al. (Analytical Chemistry, 1994, vol. 66, pages 3379-3383, IDS ref# 30) in view of Deckert et al. (Analytical Chemistry, 1998, vol. 70, pages 2646-2650; IDS ref# 22).

Vo-Dinh et al. disclose a method of detecting nucleic acid hybridization with an SERS system which comprise:

- a) a sample retention substrate (Figure 1; page 3380, 1st column);
- b) a radiation source to irradiate the sample substrate (Figures 1 and 3; page 3380, 1<sup>st</sup> column); and

Art Unit: 1637

c) an electronic unit comprising a photonic collector, Raman Spectrograph, and spectral analyzer (Figures 1 and 3; page 3379, 2<sup>nd</sup> column).

The SERS substrate is disclosed as comprising DNA (page 3380, 2<sup>nd</sup> column). The system of Vo-Dinh et al. comprises a laser light source of argon ion laser (page 3379, 2<sup>nd</sup> column, bottom paragraph) with the photonic collector of ICCD (page 3379, 2<sup>nd</sup> column, bottom paragraph). The SERS substrate of Vo-Dinh et al. is disclosed as being a microscope glass slide uniformly covered with alumina (page 3380, 1<sup>st</sup> column, bottom).

Vo-Dinh et al. do not explicitly disclose that the SERS is a near-field SERS.

Deckert et al. disclose a method of imaging a dye-labeled DNA with 100-nm resolution by near-field SERS (Abstract).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Vo-Dinh et al. with the teachings of Deckert et al., thereby arriving at the claimed invention for the following reasons.

Preliminarily, while Vo-Dinh et al. is not explicit in the ability of their system to produce lattice vibrations of the double-stranded DNA, the specification of the instant application discloses that the production of the lattice vibration in a double-stranded DNA is an inherent property when subject to SERS analysis (page 4, lines 18-21). Since the system of Vo-Dinh et al. is drawn to detecting hybridization between nucleic acids (i.e., double-stranded nucleic acids) and discloses all of the limitations of the instantly claimed system, the system of Vo-Dinh et al. is determined to meet this part of the limitation.

According to *In re Best* 195 USPQ 430, 1997, the court stated that, "Patent Office can require applicant to prove that prior art products do not necessarily or inherently possess characteristics of his claimed product wherein claimed and **prior art products are identical or substantially**

Art Unit: 1637

**identical, or are produced by identical or substantially identical processes; burden of proof is on applicant” (pp. 430).**

The motivation to combine the teachings of Deckert et al. with the teachings of Vo-Dinh et al. is based on the explicit teaching by Deckert et al., wherein the artisans state by combining SERS with near-field optics, the artisans were capable of imaging on a 100-nm scale of a dye-labeled DNA adsorbed on a SERS-active substrate (page 2646, 2<sup>nd</sup> column to page 2647, 1<sup>st</sup> column, 1<sup>st</sup> paragraph).

While the artisans are silent as to whether the labeled DNA is double-stranded or single-stranded, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Vo-Dinh et al. who already fully disclose the method of detecting double-stranded DNA (by hybridization) on a SERS substrate, wherein the detection is achieved by labeling the DNA molecules, with the teachings of Deckert et al., who employ a near-field optics to detect DNA molecules which are also labeled, so as to arrive at a much more sensitive detection method.

One of ordinary skill in the art would have had a reasonable expectation of success at combining the teachings because Vo-Dinh et al. already disclosed the possibility of detecting double-stranded DNA molecules on an SERS substrate, thus employing a near-field optics to detect the similarly labeled DNA molecules on the SERS substrate (as disclosed by Deckert et al.) would have been clearly expected to be successful with minor optimization process.

Therefore, the invention as claimed is anticipated by the cited reference.

### ***Conclusion***

Claims 1 and 2 are rejected.

Art Unit: 1637

Claims 13-20 are allowed.

The prior art neither teaches or suggests for a method of employing near-field SERS method for detecting hybridization, wherein Raman spectrograph of hybridized molecules exposed to a sample is compared to a Raman spectrograph of unhybridized, hybridizeable molecules.

While Deckert et al. disclose a method of employing near-field SERS for imaging a DNA molecule, the artisans teachings are drawn to producing an image of the surface-bound DNA molecule and in addition, lacks the above-discussed comparison of Raman spectrograph.

While Vo-Dinh disclose a method of detecting hybridized DNA molecules on a SERS surface, the artisans are silent on employing near-field SERS method.

Claims 1 and 2 are rejected under the basis that the detection of double-stranded method could be based on the imaging process, when the teaching of Vo-Dinh et al. and Deckert et al. are combined. However, claim 13 which additionally requires that the spectrographs of the DNA molecules are compared, wherein the spectrograph of the DNA molecules are produced by near-field SERS, none of the references would reasonably motivate a ordinarily skilled artisan so as to arrive at the invention as claimed.

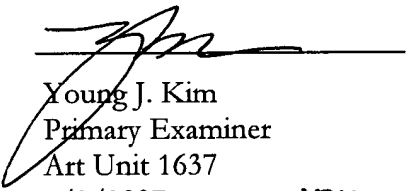
### *Inquiries*

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Young J. Kim whose telephone number is (571) 272-0785. The Examiner is on flex-time schedule and can best be reached from 8:30 a.m. to 4:30 p.m (M-W and F). The Examiner can also be reached via e-mail to Young.Kim@uspto.gov. However, the office cannot guarantee security through the e-mail system nor should official papers be transmitted through this route.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Dr. Gary Benzion, can be reached at (571) 272-0782.

Art Unit: 1637

Papers related to this application may be submitted to Art Unit 1637 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1156 OG 61 (November 16, 1993) and 1157 OG 94 (December 28, 1993) (see 37 CFR 1.6(d)). NOTE: If applicant does submit a paper by FAX, the original copy should be retained by applicant or applicant's representative. NO DUPLICATE COPIES SHOULD BE SUBMITTED, so as to avoid the processing of duplicate papers in the Office. All official documents must be sent to the Official Tech Center Fax number: (571) 273-8300. For Unofficial documents, faxes can be sent directly to the Examiner at (571) 273-0785. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-1600.



Young J. Kim  
Primary Examiner  
Art Unit 1637  
1/8/2007

**YOUNG J. KIM  
PRIMARY EXAMINER**

YJK